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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/484,421 01/18/00 DUBS

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EXAMINER

IM52/0614

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CANTEL MO. G

ART UNIT

PAPER NUMBER

1753

DATE MAILED:

06/14/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.

09/484,421

Applicant(s)

DUBS ET AL.

Examiner

Gregg Cantelmo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 04 June 1991.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 17-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2000 is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 18) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election with traverse of Group I claims 1-16 in Paper No. 8 is acknowledged.

The exact nature of Applicants traversal appears to be drawn to groups III and IV since these two groups are the only ones wherein sub-combination is mentioned.

2. Applicant's election with traverse of Groups III and IV in Paper No. 8 is acknowledged. The traversal is on the ground(s) that the office action does not demonstrate materiality sufficient to require the filing of individual applications. This is not found persuasive.

For example, relative to combination and a subcombination thereof, the examiner should point out the reasons why he or she considers the subcombination to have utility by itself or in other combinations, and why he or she considers that the combination as claimed does not rely on the subcombination as its essential distinguishing part.

This was set forth in the written restriction wherein the process of group IV can be used to form other coatings other than data storage disks (such as masters, semiconductor wafers, piezoelectric wafers, etc.). Alternatively the process of Group III can be employed in a system which uses a linear scanning magnetron, stationary substrate, continuous belt substrate, or does not require a transport chamber and load-lock chamber.

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The burden is on the examiner to provide an example as set forth above. If applicant proves or provides an argument, supported by facts, that the other use, suggested by the examiner, cannot be accomplished or is not reasonable, the burden is on the examiner to document a viable alternative use or withdraw the requirement. Applicant has not clearly done such.

The requirement is still deemed proper and is therefore made FINAL.

***Priority***

3. Applicant is advised of possible benefits under 35 U.S.C. 119(a)-(d), wherein an application for patent filed in the United States may be entitled to the benefit of the filing date of a prior application filed in a foreign country. The foreign document relied upon for the substitute specification may constitute a priority document.

***Information Disclosure Statement***

4. No IDS appears to have been filed with the application prior to this office action.

***Drawings***

5. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed. Due to numerous objections to the drawings, as evidenced by the examples set forth below, applicant is advised to carefully review all drawings and future corrected drawings for accuracy and clarity in accordance with 37 CFR 1.84.

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6. The drawings are objected to because the character numbers and letters disposed in the figures are not clear (see Figs. 6-9). In addition these Figures are not particularly clear due to the details shown in these Figures. Applicant is advised to review all drawings for clarity and legibility upon submittal of new drawings. Correction is required.

Furthermore the drawings do not include lead lines and, if need be, arrows at the end of the lead lines (for example see Fig. 3). Lead lines are those lines between the reference characters and the details referred to. Such lines may be straight or curved and should be as short as possible. They must originate in the immediate proximity of the reference character and extend to the feature indicated. Lead lines must not cross each other. Lead lines are required for each reference character except for those which indicate the surface or cross section on which they are placed. Such a reference character must be underlined to make it clear that a lead line has not been left out by mistake. Lead lines must be executed in the same way as lines in the drawing. See paragraph (l) of this section. (r) Arrows . Arrows may be used at the ends of lines, provided that their meaning is clear, as follows:

(1) On a lead line, a freestanding arrow to indicate the entire section towards which it points;

(2) On a lead line, an arrow touching a line to indicate the surface shown by the line looking along the direction of the arrow; or

(3) To show the direction of movement.

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7. The drawings are objected to under 37 CFR 1.84(h)(5) because Figures. 2a 2b show(s) modified forms of construction in the same view. Correction is required.

The solid lines depict a first embodiment of the substrate carrier and/or substrates. The dash lines appear to represent the same relationship but for a second embodiment having larger diameter substrates and/or substrate carrier. The relationship for defining the substrate diameter for a single substrate can likely be shown using one substrate size to show indication of the diameter as disclosed by applicant (Fig. 2a). Likewise this applies to Fig 2b wherein the diameter of note can be defined for one form of the carrier having multiple substrates.

### ***Specification***

8. The substitute specification filed June 30, 2000 has not been entered because it does not conform to 37 CFR 1.125(b) because: the amendment does not state that no new matter has been entered. Applicant is advised to review 37 CFR 1.125 for rules regarding filing of a substitute specification.

9. The disclosure is objected to because of the following informalities:

a. The examiner queries as to the alternative embodiments of the substrate and target configurations with respect to the dimensional relationships set forth in the instant application. For symmetrical configurations (i.e., circular or square) the relationships for defining the diameters is clear since the diameter for these configurations are identical in all directions. However when dealing with configurations that are not completely symmetrical (i.e., rectangular or elliptical)

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the specification does not appear to be enabling for which diameter is employed when defining the structural relationships. Clarity is respectfully requested within the context of the original disclosure.

b. The specification appears to be inconsistent with the target radius. " $r_{Tr}$ ", " $r_{TR}$ " and " $r_T$ " all appear to be drawn to the same radius (for example, see page 13 and instant claim 9). If this is in fact correct, applicant is advised to maintain consistency with this term throughout the specification and claims.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: are what central axis the target is symmetrical relative thereto. It would appear that the symmetry of this first recited central axis is that of the target itself (see Fig. 1 for example) Therein 2 axes are depicted, one is the

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substrate central axis and the other the target central axis. Since claim 1 clearly recites a substrate central axis, it would appear that the other central axis is that of the target. However mere recitation of a central axis without defining what this axis is central relative to, renders this axis virtual since any number of central axes are inherently present in this sputtering chamber and materially different (for example a horizontal or vertical central axis of the sputtering chamber, target, substrate holder). Applicant is advised to define the central axis relative to the target to overcome this rejection.

b. A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim 4) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 4 recites the broad recitation 30 to 60° , and the claim also recites preferably 40 to 55° and particularly equal to



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45° which are narrower statements of the broadest range/limitation recited in the same claim.

This similarly applies to claim 10 wherein a broad recitation of the distance being  $\frac{3}{4} \leq \phi_T / D \leq 2$  and a narrower preference of  $\phi_T = 1.2 D$ .

This similarly applies to claim 12 wherein a broad recitation of the substrate diameter being  $0.5 \leq \phi_S / \phi_T \leq 2.4$  and a narrower range being  $1 \leq \phi_S / \phi_T \leq 2.4$ .

This similarly applies to claim 13 wherein a broad recitation of substrate carrier diameter being  $50 \text{ mm} \leq \phi_S \leq 400 \text{ mm}$ , a narrower range being  $50 \text{ mm} \leq \phi_S \leq 300 \text{ mm}$  and specific diameters of 60 or 120 or 160 or 240 mm.

### ***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1, 3-6, 8 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent No. 5,626,727 (Yamanishi).

Fig. 2 discloses a sputtering chamber 9 having at least one sputtering source 31 with a new sputtering surface at least approximately symmetrical with respect to the center axis of target 31. Substrate carrier 17 is drivingly rotatable about a substrate carrier axis. The center axis of target 31 and the substrate carrier axis are oblique with respect to one another. Fig. 3A is drawn to any one of the targets 31 shown in Fig. 2

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and teaches of using magnets thereby causing magnetron sputtering (as applied to claim 1).

As shown in the marked up copy of Fig. 2 (see attached), the central axis of the target 31 and substrate carrier axis intersect at least approximately (as applied to claim 3).

The angle of the target relative to the substrate is about 45° (Fig. 2 as applied to claim 4). The target center axis and the substrate carrier axis have a smallest spacing thereof at the surface of substrate 18 (as applied to claim 5). The substrate is positioned horizontally (as applied to claim 6).

At least two sputter sources 31 are disposed to simultaneously affect a substrate (Fig. 2 as applied to claim 8).

A plasma will be struck and contained within a region between the target and substrate. Thus the target and substrate in part bound the process space on two sides (As applied to claim 15).

14. Claims 1, 3, 4, 6, 7, 9-12, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent No. 4,756,810 (Lamont).

Fig. 1 discloses a sputtering chamber comprising a magnetron sputter source 36 with new sputter surface 42 symmetrical about a central axis of the source. A substrate carrier 12 is arranged to be drivingly rotatable about a substrate carrier axis via rotation means 18. The central axis of the magnetron source and the substrate carrier central axes are oblique to one another (as applied to claim 1).

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The axes which defines each of the target and substrate carrier are infinite along the plane which defines each of these axes. Since the axes are oblique, they will intersect (see attached marked up copy of Fig. 1 as applied to claim 3). The angle of the target surface relative to the substrate carrier is between 30 and 60° (Fig. 1 and col. 7, lines 49-51 as applied to claim 4). The substrate carrier is positioned horizontally relative to the bottom of the chamber (as applied to claim 6). The target surface is greater than the substrate to be coated (Fig. 1 as applied to claim 7).

Lamont has an inherent distance  $D$  (the smallest spacing between the central axis and the substrate carrier from the sputter surface) and the radius  $r_T$  (the largest erosion depth profile) which would be in the central region of the outer magnetic field lines (See Fig. 1). Given that Lamont inherently has these two features in the same configuration as the instant claims and that the approximated distance  $D$  as compared to the radius  $r_T$  is about twice as great, one of ordinary skill in the art would expect this configuration to result in an inherent ratio between  $\frac{1}{4}$  and  $\frac{2}{3}$  (as applied to claim 9). As well given the relative relationship of distance  $D$  in comparison to the diameter of the target, one of ordinary skill in the art would expect that the target diameter would be about twice as great as the smallest distance  $D$  (as shown in marked up copy of Fig. 1 as applied to claim 10). Distance  $D$  appears to be about the same length as that of the substrate diameter and would inherently arrive at a ratio of 1.8 or less (as applied to claim 11). The diameter of substrate receiving surface is about half the diameter of that of the target (as applied to claim 12).

A plasma will be struck and contained within a region between the target and substrate. Thus the target and substrate in part bound the process space on two sides (As applied to claim 15).

***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamanishi or Lamont in view of U.S. patent Nos. 5,288,379 (Namiki) or 5,855,681 (Maydan)

The teachings of both Yamanishi and Lamont have been discussed above and are incorporated herein.

The difference between instant claim 16 and either Yamanishi or Lamont is that neither reference readily discloses connecting the sputtering chamber to a transport chamber with at least one lock chamber in which substrates are transferable from surroundings thereof into and out of a vacuum.

Use of a cluster tool arrangement wherein sputtering chambers are connected to a transfer chamber and load lock chamber is known in the art (see Namiki Fig. 1). Use of such systems allows for multiple film deposition processes to occur without exposing the substrate to contaminant atmospheric gases during the intermediate coating steps.

The term "cluster tool " generally refers to a modular, multichamber, integrated processing system having a central wafer handling module and a number of peripheral process chambers. Cluster tools have become generally accepted as effective and efficient equipment for manufacturing advanced microelectronic devices. Wafers are introduced into a cluster tool where they undergo a series of process steps sequentially in various process chambers to form integrated circuits. The transfer of the wafers between the process chambers is typically managed by a wafer handling module located in a central transfer region. Typically, cluster tools are of two different types: single wafer processing or batch wafer processing. Single wafer processing generally refers to a chamber configuration in which a single wafer is located for processing. Batch wafer processing generally refers to a chamber configuration in which multiple wafers are positioned on a turntable and are processed at various positions within the chamber as the turntable rotates through 360.degree.. A cluster tool configured for batch processing allows multiple wafers, typically from four (4) to seven (7) wafers, to be simultaneously processed in a single chamber. (Maydan, col. 1, lines 15-36).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of either Yamanishi or Lamont by connecting it to a cluster tool arrangement as taught by Namiki or Maydan since it would have provided a means for depositing multiple films on a substrate without exposing the substrate to contaminant atmospheric gases during intermediate coating steps.

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17. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over in view of either Yamanishi or Lamont either in view of U.S. patent No. 4,853,102 (Tateshi) or 6,051,113 (Moslehi).

The teachings of both Yamanishi and Lamont have been discussed above and are incorporated herein.

The difference between instant claim 14 and either Yamanishi or Lamont is that neither reference readily discloses moving the substrate linearly in a direction parallel to the substrate carrier axis (claim 14).

Tateshi discloses a magnetron sputtering apparatus wherein the substrate support moves laterally. The lateral movement means allows for positioning a substrate such that it can be transferred to and from the processing chamber while also providing close target to substrate processing during deposition (see Fig. 7). It is well known in the art to position a gate for introducing the substrate to the processing chamber, near the bottom of the chamber and thereafter raise the substrate and substrate platen to an upper position closer to the target.

Additionally use of an actuator to move the substrate in a vertical position to achieve a predetermined deposition distance between the substrate and the tantalum target in order to establish the optimal deposition uniformity and material properties (Moslehi, col. 11 lines 29-35).

The motivation for providing means for moving the substrate carrier in this fashion is to raise the substrate from a substrate chamber insertion position to a wafer film deposition position. It is also known that providing means to move the substrate

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vertically relative to the deposition source to establish optimal deposition uniformity and material properties.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Yamanishi or Lamont by moving the substrate carrier in this fashion since it would provided means for a wafer inserted at the base of the chamber sidewall to be moved in close proximity to the target and further such movement would have optimized deposition uniformity and material properties of the thin film.

18. Claims 1-4, 6-7, 9-12, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese laid-open patent publication No. 10-147 864 (JP 864) in view of either Lamont or Yamanishi.

Reference is made to the figure associated with the abstract. Therein is disclosed a sputtering chamber 1 with sputter source 4 having a sputter surface symmetrical to a center axis of the target (coaxial with power line to the target). Substrate 7 is arranged to be drivingly rotatable about substrate carrier 8 axis (defined by rotation axis 9). The central axis of the target and substrate carrier axis are oblique with respect to each other (as applied to claim 1).

The target has a 300 mm diameter (translated paragraph [0007]) and thus is circular and has rotational symmetry about it's central axis (as applied to claim 2). As shown in the marked up figure, the axes will intersect (as applied to claim 3). The oblique angle between the target central axis and substrate carrier axis is shown to be 45° (as applied to claim 4).

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The nature of the term horizontally as described in claim 6 is virtual since there is no reference plane for ascertaining what the substrate is horizontal relative to. Thus the planar substrate is configured horizontally relative to any number of surfaces including the substrate carrier surface or top surface of the casing of motor 10 (as applied to claim 6).

The substrate is an 8 inch substrate (i.e. about 200 mm) and the target is 300 mm (see translated paragraphs and [0054] and [0050] respectively). Thus a projection of the new sputter surface onto a plane perpendicular to the central axis of the target (i.e. the target diameter) is larger than the surface to be coated (i.e. the substrate diameter as applied to claim 7).

The target diameter is 300 mm as is the distance of the target to the substrate (see translated paragraph [0007]). Thus  $D=300$  mm. The ratio of the target diameter (300 mm) to the target to substrate distance (300 mm) is 1 (as applied to claim 10).

The target to substrate distance is 300 mm and the substrate diameter is 8 inches (200 mm). The ratio of the substrate diameter to target to substrate distance is  $200 \text{ mm} / 300 \text{ mm}$  or 0.67 (as applied to claim 11).

The substrate surface diameter is 200 mm and the target diameter is 300 mm. The ratio of the substrate diameter to the target diameter is about 0.67 (as applied to claim 12).

The substrate diameter is 200 mm (as applied to claim 13).



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A plasma will be struck and contained within a region between the target and substrate. Thus the target and substrate in part bound the process space on two sides (As applied to claim 15).

The difference between the instant claims and JP 864 is that JP 864 does not disclose that the sputtering target is a magnetron sputtering source (claim 1).

Modification of sputtering sources to include a magnet array is known in the art as shown by Lamont and Yamanishi as discussed above in the 102 rejections, incorporated herein. Therein both Lamont and Yamanishi employ oblique sputter deposition to form desired films on a substrate surface.

Use of magnetron sputtering increase the rate of deposition of thin films significantly over that of non-magnetron sputtering systems. This allows for mass-production of thin films (col. 1, lines 14-20 of Yamanishi).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '864 by modifying the sputtering sources to be magnetron sputtering as taught by either Lamont or Yamanishi since it would have increased the deposition rate and allowed for mass-production of thin films.

19. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 864 in view of either Lamont or Yamanishi as applied to claims 1-4, 6-7, 9-12 and 15 above, and further in view of either Tateshi or Moslehi.

The difference not yet discussed is of moving the substrate linearly in a direction parallel to the substrate carrier axis (claim 14).

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Tateshi discloses a magnetron sputtering apparatus wherein the substrate support moves laterally. The lateral movement means allows for positioning a substrate such that it can be transferred to and from the processing chamber while also providing close target to substrate processing during deposition (see Fig. 7). It is well known in the art to position a gate for introducing the substrate to the processing chamber, near the bottom of the chamber and thereafter raise the substrate and substrate platen to an upper position closer to the target.

Additionally use of an actuator to move the substrate in a vertical position to achieve a predetermined deposition distance between the substrate and the tantalum target in order to establish the optimal deposition uniformity and material properties (Moslehi, col. 11 lines 29-35).

The motivation for providing means for moving the substrate carrier in this fashion is to raise the substrate from a substrate chamber insertion position to a wafer film deposition position. It is also known that providing means to move the substrate vertically relative to the deposition source to establish optimal deposition uniformity and material properties.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP 864 by moving the substrate carrier in this fashion since it would provided means for a wafer inserted at the base of the chamber sidewall to be moved in close proximity to the target and further such movement would have optimized deposition uniformity and material properties of the thin film.

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20. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 864 in view of either Lamont or Yamanishi as applied to claims 1-4, 6-7, 9-12 and 15 above, and further in view of either Namiki or Maydan.

The difference between instant claim 16 and JP 864 does not disclose connecting the sputtering chamber to a transport chamber with at least one lock chamber in which substrates are transferable from surroundings thereof into and out of a vacuum.

Use of a cluster tool arrangement wherein sputtering chambers are connected to a transfer chamber and load lock chamber is known in the art (see Namiki Fig. 1). Use of such systems allows for multiple film deposition processes to occur without exposing the substrate to contaminant atmospheric gases during the intermediate coating steps.

The term "cluster tool " generally refers to a modular, multichamber, integrated processing system having a central wafer handling module and a number of peripheral process chambers. Cluster tools have become generally accepted as effective and efficient equipment for manufacturing advanced microelectronic devices. Wafers are introduced into a cluster tool where they undergo a series of process steps sequentially in various process chambers to form integrated circuits. The transfer of the wafers between the process chambers is typically managed by a wafer handling module located in a central transfer region. Typically, cluster tools are of two different types: single wafer processing or batch wafer processing. Single wafer processing generally refers to a chamber configuration in which a single wafer is located for processing. Batch wafer processing generally refers to a chamber configuration in which multiple

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wafers are positioned on a turntable and are processed at various positions within the chamber as the turntable rotates through 360.degree.. A cluster tool configured for batch processing allows multiple wafers, typically from four (4) to seven (7) wafers, to be simultaneously processed in a single chamber (Maydan, col. 1, lines 15-36).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP 864 by connecting it to a cluster tool arrangement as taught by Namiki or Maydan since it would have provided a means for depositing multiple films on a substrate without exposing the substrate to contaminant atmospheric gases during intermediate coating steps.

### ***Conclusion***

21. In the event that applicant amends the claims, it is respectfully requested that applicant point out where and/or how the originally filed disclosure supports the amendment(s) (i.e., page(s) and line(s); figure(s); etc.). By doing so, the examiner can clearly locate such support and reduce the probability of new matter rejections.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (703) 305-0635. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:30 p.m.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on (703) 308-3322.

FAX communications should be sent to the appropriate FAX number: (703) 305-3599 for After Final Responses only; (703) 305-7718 for all other responses. FAXES received after 4 p.m. will not be processed until the following business day.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

gc

  
NAM NGUYEN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700

June 11, 2001

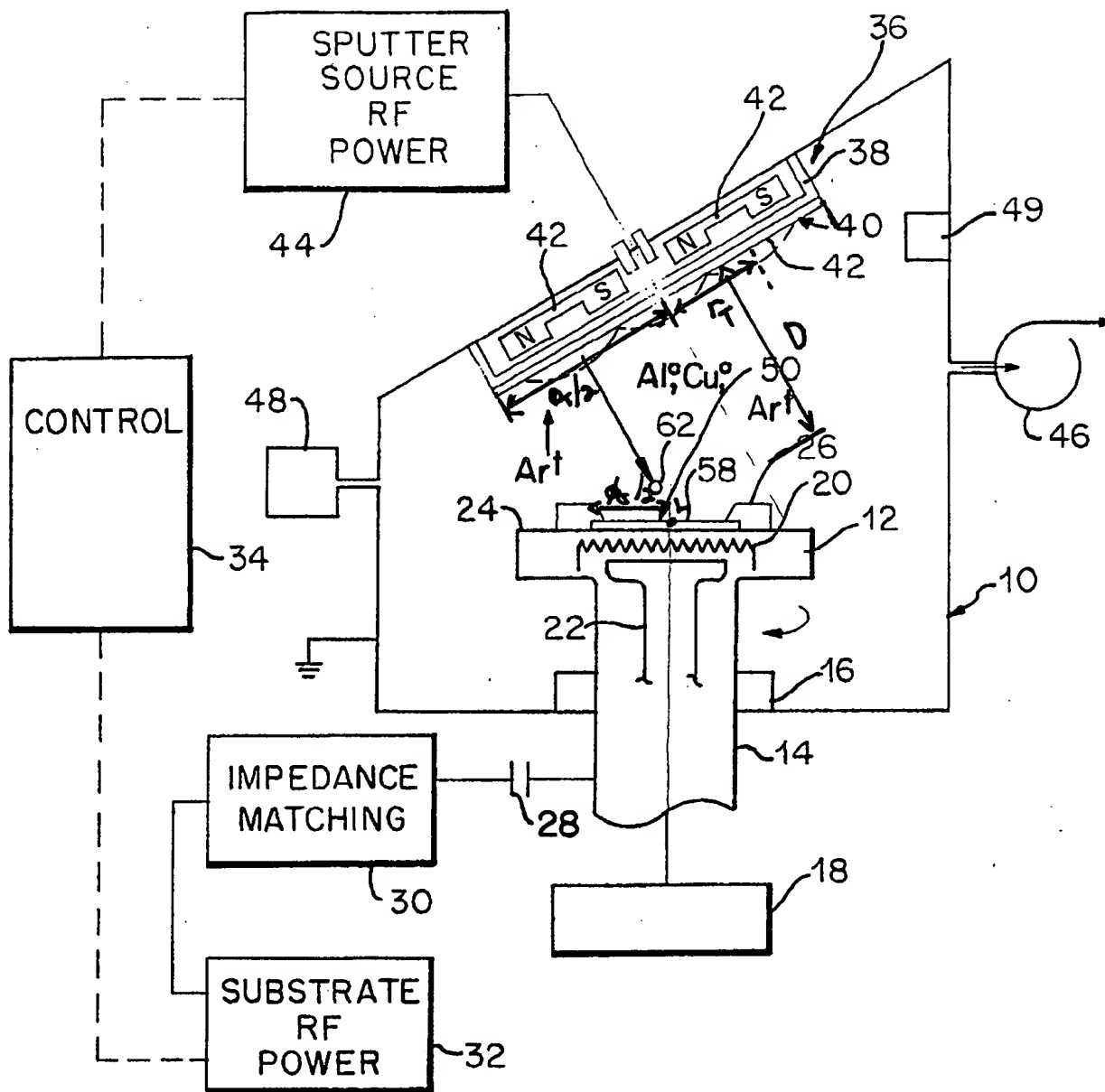


FIG. 1

